

Remarks

Claims 1, 13, and all remaining claims by virtue of dependency have been amended to recite that at least one of the frame and said separator plate have support bumps. Written and graphical support for this amendment is shown and described at Figure 5 and in the paragraph bridging pages 10 and 11. No new matter is added thereby.

Claims 1, 13, and all remaining claims by virtue of dependency have been amended to recite that the seal formed between the outer edge of the separator plate and the frame forms a manifold allowing the flow of gasses across the PEN cell. Support for this amendment is shown and described at paragraph 0011. No new matter is added thereby.

35 USC § 103 (a)

The examiner has rejected claims 1, 3, 8-15, and 17 as being unpatentable under 35 USC § 103(a) over Haltiner et al. (US 2003/0235746A1) in view of Pondo (US 6,017,649).

The examiner recites that Haltiner fails to teach the stamped separator plate and frame with displaced outer edges. The examiner suggests that the cathode spacer and separator are “analogous” to the stamped separator plate, and that the anode spacer is “analogous” to the frame, but still admits that these lack the downwardly displaced outer edge.

The examiner’s suggestion of an “analogy” is flawed. Lacking the displaced outer edge, the plates and spacers of Haltiner cannot be sealed at their outer edges to form

a gas pathway across the PEN. Instead, Haltiner must seal the plates and spacers themselves, rather than sealing their outer edges, to form the gas pathway. Further, the alleged “analogy” ignores the fact that one of the advantages of the present invention is that the present invention eliminates the cost and complexity of manufacturing multiple dissimilar parts, including the spacers, taught by Haltiner. Accordingly, the only way that two approaches could be said to be “analogous” is that the Haltiner disclosure accomplishes some of the same end results of the present invention, but does so in a much more complex and expensive manner, as the novel approach of the present invention that accomplishes the results with fewer dissimilar parts. While this distinction was present in the comparison of Haliner and prior claims that were limited to a separator plate, a frame, and a PEN cell, the applicant has now made the distinction even more explicit by adding the language “to form a manifold and a hermetic seal between the outer edge of the separator plate and the frame thereby allowing the flow of gasses across the PEN cell” to claims 1 and 13.

Regardless of the validity of the examiner’s purported analogy between the relatively complex and expensive approach of Haltiner and the relatively inexpensive, simplified and novel approach of the present invention, the examiner has nevertheless conceded that Haltiner does not show the feature of displacing the outer edge. Instead, the examiner suggests that Pondo provides this teaching. However, it is clear that Pondo does not.

In the first instance, Pondo is not using PEN cells in Pondo’s stack. Instead, Pondo is working with a series of flat carbonate and matrix materials that form not only

the anode and cathode faces of the fuel cell, but also form the internal gas manifolds of the device. Pondo makes this explicit at column 6, lines 58-64 where Pondo recites:

When the cell components are stacked, the aligned perforations in separator plate 10, first matrix layer 14, first carbonate layer 15, second matrix layer 16, second carbonate layer 17, and third matrix layer 18 form internal gas manifolds for transport of reactant gases to and from the anode and cathode facing faces of separator plate 10.

The examiner argues that Pondo provides the teaching missing from Haltiner. Specifically, the examiner argues that Pondo provides the teaching of the downwardly displaced missing edge. However, while Pondo does teach displacing the metal used in Pondo's separator plates, the displacement is not the outer edge, it is at an internal surface. Further, the displacement is simply to form a series of flattened sections (shown as 10 in Figure 3A) that each form a better seal with the flat matrix and carbonate layers (shown as 14, 15, 16, 19 and 20 in Figure 3A) of Pondo's fuel cell.

Pondo explicitly teaches that it is these flat surfaces of the flat matrix and carbonate layers of Pondo's fuel cell, and NOT the separator plates, that forms the "internal gas manifolds for transport of reactant gases." Accordingly, it is at this exact point where the examiner relies on the Pondo disclosure to show obviousness that Pondo teaches directly away from the claimed invention.

Pondo does displace the metal in the separator plates, but does not do so to form the manifold. Pondo's separator plates do not form the manifold or the gas pathway. Pondo's manifold and gas pathway is formed by the flat matrix and carbonate layers. In contradistinction, the present invention claims the downwardly displaced outside edges are used to form both the manifold and the gas pathway. While this was also true in

the prior claims, the applicant has made the point even more explicit by adding the limitation “attaching said frame to said separator plate to form a manifold and a hermetic seal between the outer edge of the separator plate and the frame thereby allowing the flow of gasses across the PEN cell.”

According to the USPTO guidelines setting forth examination procedures in light of *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727 (2007), (hereafter the “guidelines”) “any obviousness rejection should include, either explicitly or implicitly in view of the prior art applied, an indication of the level of ordinary skill. A finding as to the level of ordinary skill may be used as a partial basis for a resolution of the issue of obviousness.” As is plain from the Haltiner and Pondo reference, those of ordinary skill in the art taught away from the applicant’s approach to fabricating a cassette for a solid oxide fuel cell (SOFC) stack. Specifically, those of ordinary skill taught away from an arrangement where the frame is attached to the separator plate to form a manifold and a hermetic seal between the outer edge of the separator plate and the frame, thereby allowing the flow of gasses across the PEN cell. Accordingly, the Patent and Trademark Office cannot show that one of an ordinary level of skill would contemplate the present invention as claimed.

The applicant therefore respectfully requests that the examiner remove rejection of claims 1, 3, 8-15, and 17 as being unpatentable under 35 USC § 103(a) over Haltiner et al. (US 2003/0235746A1) in view of Pondo (US 6,017,649).

The examiner has rejected claims 2 and 16 as being unpatentable under 35 USC § 103(a) over Haltiner et al. (US 2003/0235746A1) in view of Pondo (US 6,017,649) and

further in view of Carolan et al (US Pat. No. 5,750,279). While it may be true that Carolan et al (US Pat. No. 5,750,279) teaches the use of 400 series stainless in a PEN fuel cell, Carolan does not remotely teach stamping either the separator plate or the frame at all. Instead, Carolan shows a complex arrangement of machined parts (See figs 11, 12 and 13) including separate tubular cells 84, end caps 82, and hollow conduit 86, all of which are missing from the present invention, and readily distinguished from the claimed features of a stamped separator plate having an outer edge and at least one oxygen manifold collar displaced in an upward direction and the stamped frame has an outer edge and at least one hydrogen manifold collar displaced in an downward direction. Since both claims 2 and 18 incorporate these features by dependency, and since neither Haltiner nor Pondo (US 6,017,649) provide this teaching, for the reasons set forth above, Carolan does not teach these limitations of the claims as presented. The applicant therefore respectfully requests that the examiner remove rejection of claims 2 and 16 as being unpatentable under 35 USC § 103(a) over Haltiner et al. (US 2003/0235746A1) in view of Pondo (US 6,017,649) and further in view of Carolan et al (US Pat. No. 5,750,279).

The examiner has further rejected claims 4-7 and 18-21 as being unpatentable under 35 USC § 103(a) over Haltiner et al. (US 2003/0235746A1) in view of Pondo (US 6,017,649) and further in view of James et al. (US Pat. No. 5,766,789 A). Claims 4-7 are ultimately dependent from, and thereby incorporate all the limitations of, claim 1, and claims 18-21 are ultimately dependent from, and thereby incorporate all the limitations of, claim 13.

Haltiner and Pondo are readily distinguished from the claimed features of a stamped separator plate having an outer edge and at least one oxygen manifold collar displaced in an upward direction and the stamped frame has an outer edge and at least one hydrogen manifold collar displaced in an downward direction, attaching said frame to said separator plate to form a manifold and a hermetic seal between the outer edge of the separator plate and the frame, thereby allowing the flow of gasses across the PEN cell, for the reasons described above.

Claims 4-7 and 18-21 incorporate all of these features by dependency, and neither Haltiner, Pondo nor James provide this teaching. Indeed, James does not remotely teach stamping at all, as James fails to describe the housing altogether. Accordingly, James does not discuss either the separator plate or the frame at all. Instead, James simply describes fuel cells as having “passageways” for fuel and oxidant generally, without showing any arrangement or assembly to provide these passageways. At column 4, lines 5-24 James states:

A fuel cell is an apparatus for continually producing electric current by electrochemical reaction of a fuel with an oxidizing agent. More specifically, a fuel cell is a galvanic energy conversion device that chemically converts a fuel such as hydrogen or a hydrocarbon and an oxidant that catalytically react at electrodes to produce a DC electrical output. In one type of fuel cell, the cathode material defines passageways for the oxidant and the anode material defines passageways for fuel. An electrolyte separates the cathode material from the anode material. The fuel and oxidant, typically as gases, are continuously passed through the cell passageways for reaction. The essential difference between a fuel cell and a battery is that there is a continuous supply of fuel and oxidant from outside the fuel cell. Fuel cells produce voltage outputs that are less than ideal and decrease with increasing load (current density). Such decreased output is in part due to the ohmic losses within the fuel cell, including electronic impedances through the electrodes, contacts and current collectors. A need therefore exists for fuel cells that have reduced ohmic losses. The graphite current collectors used in phosphoric acid and solid polymer electrolyte fuel cells, to the cathode metal

oxides such as, praseodymium oxide, indium oxide used in solid oxide fuel cells and to the nickel oxide cathode used in molten carbonate fuel cells are examples of a need for conductive additives. See generally, "Handbook of Batteries and Fuel Cells", Edited by Linden

Accordingly, James is missing all of the limitations set forth in the present claims of a stamped separator plate having an outer edge and at least one oxygen manifold collar displaced in an upward direction and the stamped frame has an outer edge and at least one hydrogen manifold collar displaced in an downward direction, attaching said frame to said separator plate to form a manifold and a hermetic seal between the outer edge of the separator plate and the frame, thereby allowing the flow of gasses across the PEN cell. The applicant therefore respectfully requests that the examiner remove rejection of claims 4-7 and 18-21 as being unpatentable under 35 USC § 103(a) over Haltiner et al. (US 2003/0235746A1) in view of Pondo (US 6,017,649) and further in view of James et al. (US Pat. No. 5,766,789 A).

Conclusion

Applicant has made an earnest attempt to place the above referenced application in condition for allowance and action toward that end is respectfully requested. Should the Examiner have any further observations or comments, she is invited to contact the undersigned for resolution.

Respectfully submitted,

/s/
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Date

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The undersigned hereby certifies that the forgoing Preliminary Amendment dated November 9, 2009 in responsive to the final office action of June 8, 2009 together with a fee sheet (PTO form SB/22), a request for continuing examination (PTO form SB/30), were filed electronically with the USPTO on the date set forth below.

/s/ _____ 11/9/2009
Douglas E. McKinley, Jr. Date
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